Abstract Submitted
for the SES12 Meeting of
The American Physical Society

Spectral Selectivity of Photoinduced Effects in As_xS_{100-x} Glass Thin Films JAMES YORK-WINEGAR, Austin Peay State University, KAREL PÁLKA, MIROSLAV VLČEK, University of Pardubice, JUSTIN OELGOETZ, ANDRIY KOVALSKIY, Austin Peay State University — Spectral dependence of photoinduced effects in As_xS_{100-x} ($x = 30, 35, 40$) amorphous thin films were studied using Raman spectroscopy, atomic force microscopy (AFM), and ellipsometry. Samples were exposed to LED light in an argon environment to avoid oxidation on the surface layer. AFM measurements reveal that our samples are of optical quality before and after exposure, allowing for application of these thin films. Ellipsometry was used measure exact penetration depths using the Beer-Lambert law. For all investigated compositions the Raman spectra taken after 375 and 405 nm exposures do not differ noticeably. The same conclusion holds for samples exposed to 450 and 525 nm light, however these two sets experienced different structural transformations. Irradiation of the virgin samples causes photopolymerization effect and significant widening of the vibrational bands. For stoichiometric comparison ($x = 40$) the lower ratio between As_4S_3 cages and As_4S_4 units is observed for UV exposed sample in comparison with irradiated by band gap light. For all exposure wavelength there is also no evidence for S chains and S_8 fragments after irradiation.Theoretical calculations using density functional theory are currently underway.

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Date submitted: 19 Sep 2012 Electronic form version 1.4